< 0.01 compared to the vehicle group of 254.8 ± 24.1 mg/dl) and returned to normoglycemic level. In lean littermates, there was a trend towards reduction in fasting blood glucose levels as seen in FIG. 5. However, the glucose concentration did not decrease significantly on Day 12 compared to the vehicle-treated mice (193 ± 2.9 mg/dl vs. 213 ± 7.4 mg/dl).

***Panax quinquefolius* berry extract**

ob/ob mice received daily intraperitoneal (IP) injection of *Panax quinquefolius* ginseng berry extract 150 mg/kg or vehicle. On Day 0, *ob/ob* mice had high baseline fasting blood glucose levels (183.2 ± 8.6 mg/dl in the extract-treated group and 212.0 ± 14.9 mg/dl in vehicle-treated group). On Day 5 and Day 12, *Panax quinquefolius* ginseng berry extract 150 mg significantly decreased fasting blood glucose to 147.5 ± 5.8 mg/dl and to 164.8 ± 6.5 mg/dl, respectively (both $P < 0.05$ compared to Day 0). In the vehicle-treated group, the fasting blood glucose levels did not change significantly (212.0 ± 14.9 mg/dl on Day 0, 243.2 ± 130.9 mg/dl on Day 5 and 211.6 ± 20.8 mg/dl on Day 12). FIG. 6 shows percentage changes of fasting blood glucose levels after treatment, with Day 0 levels normalized to 100%.

Ginsenoside Re

Blood glucose levels after 4 hr fasting were measured on Day 0, Day 5, and Day 12 after daily administration of ginsenoside Re. FIG. 7 shows dose-dependent effects of ginsenoside Re on fasting blood glucose in *ob/ob* mice. Fasting blood glucose concentrations decreased significantly after treatment with 20 mg/kg ginsenoside Re on Day 5 of 188 ± 9.2 mg/dl and Day 12 of 180 ± 10.8 mg/dl (both $P < 0.01$ compared to vehicle-treated group on Day 5 of 234 ± 13.7 mg/dl and Day 12 of 239 ± 13.3 mg/dl). Fasting blood glucose concentrations did not change sizably in lean mice after treatment with ginsenoside Re.

Polysaccharides fraction from *Panax quinquefolius*

As shown in FIG. 8, *ob/ob* mice had remarkably high baseline fasting blood glucose levels. Polysaccharide fractions of *Panax quinquefolius* berry extract at doses of 50 mg and 150 mg significantly decrease fasting blood glucose levels. On Day 5, compared to the vehicle-treated mice (230.5 ± 13.5 mg/dl), 50 mg/kg and 150 mg/kg polysaccharides-treated animals had significantly lower fasting blood glucose levels (187.4 ± 20.5 mg/dl and 187.4 ± 17.1 mg/dl, respectively; both $P < 0.05$). On Day 10, compared to the vehicle group (240.1 ± 12.3 mg/dl), 50 mg/kg polysaccharides-treated mice were 188.4 ± 12.6 mg/dl ($P < 0.05$), and 150 mg/kg polysaccharides-treated mice were normoglycemic (148.8 ± 17.6 mg/dl, $P < 0.01$). However, those *ob/ob* mice treated with vehicle did not show significant changes in fasting blood glucose levels.

To observe whether there was an effect on fasting blood glucose concentration after cessation of polysaccharides treatment, the blood glucose was measured every five days until the levels returned to those prior to the treatment. FIG. 9 shows a prolonged effect in animals who received 150 and 50 mg/kg polysaccharides treatment. Fasting blood glucose levels were 168.6 ± 17.7 and 155.6 ± 7.4 on Day 15, 176.8 ± 15.4, 163.8 ± 15.7 on Day 20, and 185.6 ± 7.9 and 174.8 ± 10.4 on Day 25, respectively (all $P < 0.01$ compared to the vehicle group).

Collectively, the above results clearly demonstrate that extracts of *Panax ginseng* berry, *Panax quinquefolius* berry, ginsenoside Re or polysaccharides from *Panax quinquefolius* significantly improved glucose homeostasis in diabetic mouse models; thus, these compounds are anti-hyperglycemic. Yet further, the data indicates that the effects of the compounds can last for an extended period of time. Thus, one skilled in the art will recognize that the above data demonstrate that ginseng berry extract, ginsenoside Re and polysaccharides can be used to treat diabetes.

EXAMPLE 9

INTRAPERITONEAL GLUCOSE TOLERANCE TEST (IPGTT)

Animals were treated with *Panax ginseng* berry extract, *Panax quinquefolius* berry extract, ginsenoside Re, or a polysaccharide fraction from *Panax quinquefolius*. IPGTT was performed on Day 0 and Day 12. On the days of the test, animals were fasted for 4 hr (starting from 9:00AM) followed by an IP administration of glucose (2 g/kg). Blood glucose levels were determined in tail blood samples at 0 (prior to glucose administration), and 30, 60 and 120 min after glucose administration.

Panax ginseng berry extract

Glucose tolerance was evaluated by IPGGT, prior to and 12 days after treatment in *ob/ob* and lean mice with the extract or vehicle. As shown in FIG. 10, on Day 0, *ob/ob* mice demonstrated basal hyperglycemia, and this hyperglycemia was exacerbated by the IP glucose load, and failed to return to fasting level after 120 min, indicating glucose intolerance. After 12 days of treatment with *Panax ginseng* berry extract 50 mg/kg (FIG. 10B) and 150 mg/kg (FIG. 10C), the glucose tolerance of the *ob/ob* mice was dose-dependently improved. On Day 12, the blood glucose levels at 120 min following glucose administration approached to baseline (fasting) levels in 150 mg/kg extract treated *ob/ob* mice. The area under the curve (AUC) of blood glucose was decreased by approximately 46% compared to Day 0 in the 150 mg/kg extract-treated *ob/ob* mice group. This was a significant improvement in glucose exposure from 623 mg/ml•min of Day 0 to 334 mg/ml•min of Day 12 ($P < 0.01$). In contrast, the glucose tolerance of lean control mice was unaffected by the both vehicle or 150 mg/kg extract.

Yet further, another diabetic animal model was used to test glucose disposal after treatment with *Panax ginseng* berry. Glucose disposal was evaluated by IPGTT, prior to and 12 days post treatment with the extract or vehicle. As shown in FIG. 11, on Day 0, *db/db* mice demonstrated basal hyperglycemia, and this hyperglycemia was exacerbated by the IP glucose load, and did not return to baseline after 120 min indicating glucose